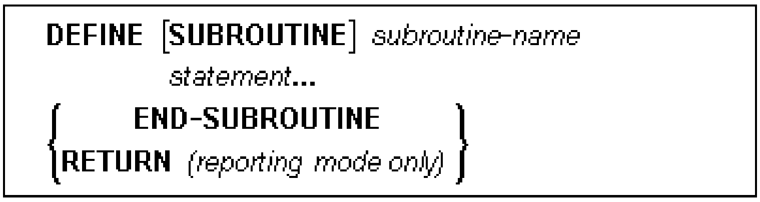
DEFINE SUBROUTINE



```
DEFINE [SUBROUTINE] subroutine-name
          statement...
{      END-SUBROUTINE          }
{RETURN (reporting mode only)  }
```

Related Statements: PERFORM | DEFINE DATA PARAMETER

Function

The DEFINE SUBROUTINE statement is used to define a Natural subroutine. A subroutine is invoked with a PERFORM statement.

Inline/External Subroutines

A subroutine may be defined within the object which contains the PERFORM statement that invokes the subroutine (inline subroutine); or it may be defined external to the object that contains the PERFORM statement (external subroutine). An inline subroutine may be defined before or after the first PERFORM statement which references it.

Note:
Although the structuring of a program function into multiple external subroutines is recommended for achieving a clear program structure, please note that a subroutine should always contain a larger function block because the invocation of the external subroutine represents an additional overhead as compared with inline code or subroutines.

subroutine-name

For a subroutine name (maximum 32 characters), the same naming conventions apply as for user-defined variables (see the Natural Reference documentation).

The subroutine name is independent of the name of the module in which the subroutine is defined (it may but need not be the same).

Subroutine Termination

The subroutine definition is terminated with END-SUBROUTINE. In reporting mode, RETURN may also be used to terminate a subroutine.

Restrictions

Any processing loop initiated within a subroutine must be closed before END-SUBROUTINE is issued.

An inline subroutine must not contain another DEFINE SUBROUTINE statement (see Example 1 below).

An external subroutine (that is, an object of type subroutine) must not contain more than one DEFINE SUBROUTINE statement block (see Example 2 below). However, an external DEFINE SUBROUTINE block may contain further inline subroutines (see Example 1 below).

Example 1

The following construction is possible in an object of type subroutine, but not in any other object (where SUBR01 would be considered an inline subroutine):

```
...
DEFINE SUBROUTINE SUBR01
   ...
   PERFORM SUBROUTINE SUBR02
   PERFORM SUBROUTINE SUBR03
   ...
   DEFINE SUBROUTINE SUBR02
   /* inline subroutine...
   END-SUBROUTINE
 ...
   DEFINE SUBROUTINE SUBR03
   /* inline subroutine...
   END-SUBROUTINE
END-SUBROUTINE
END
```

Example 2 (invalid):

The following construction is `not` allowed in an object of type subroutine:

```
...
DEFINE SUBROUTINE SUBR01
...
END-SUBROUTINE
DEFINE SUBROUTINE SUBR02
...
END-SUBROUTINE
END
```

Data Available in a Subroutine

- Inline Subroutines
- External Subroutines

Inline Subroutines

No explicit parameters can be passed from the invoking program via the PERFORM statement to an internal subroutine.

An inline subroutine has access to the currently established global data area as well as to the local data area used by the invoking program.

External Subroutines

An external subroutine has access to the currently established global data area. Moreover parameters can be passed directly with the PERFORM statement from the invoking object to the external subroutine; thus, you may reduce the size of the global data area.

An external subroutine has no access to the local data area defined in the calling program; however, an external subroutine may have its own local data area.

Example 1

```
/* EXAMPLE ’DSREX1S’: DEFINE SUBROUTINE (STRUCTURED MODE)
/**************************************************************
DEFINE DATA LOCAL
1 EMPLOY-VIEW VIEW OF EMPLOYEES
  2 NAME
  2 ADDRESS-LINE  (A20/2)
  2 PHONE
1 #ARRAY (A75/1:4)
1 REDEFINE #ARRAY
  2 #ALINE  (A25/1:4,1:3)
1 #X (N2) INIT <1>
1 #Y (N2) INIT <1>
END-DEFINE
/**************************************************************
FORMAT PS=20
LIMIT 5
FIND EMPLOY-VIEW WITH NAME = ’SMITH’
 MOVE NAME            TO #ALINE (#X,#Y)
 MOVE ADDRESS-LINE(1) TO #ALINE (#X+1,#Y)
 MOVE ADDRESS-LINE(2) TO #ALINE (#X+2,#Y)
 MOVE PHONE           TO #ALINE (#X+3,#Y)
 IF  #Y = 3
  RESET INITIAL #Y
  PERFORM PRINT
 ELSE
  ADD 1 TO #Y
 END-IF
 AT END OF DATA
  PERFORM PRINT
 END-ENDDATA
END-FIND
/**************************************************************
DEFINE SUBROUTINE PRINT
WRITE NOTITLE (AD=OI) #ARRAY(*)
RESET #ARRAY(*)
SKIP 1
END-SUBROUTINE
/**************************************************************
END
```

```
SMITH                    SMITH                    SMITH
  ENGLANDSVEJ 222          3152 SHETLAND ROAD       14100 ESWORTHY RD.
                           MILWAUKEE                MONTERREY
  554349                   (414)877-4563            (408)994-2260

  SMITH                    SMITH
  5 HAWTHORN               2307 DARIUS LANE
  OAK BROOK                TAMPA
  (312)150-9351            (813)131-4010
```

Example 2

```
/* EXAMPLE 'DSREX2'
/* SAMPLE STRUCTURE FOR EXTERNAL SUBROUTINE USING GLOBAL DATA
/************************************************************
/* PROGRAM CONTAINING SUBROUTINE
DEFINE DATA GLOBAL USING GLOBAL-1
            LOCAL  1 FIELD (N7)
END-DEFINE
/* ...
/* ...
/* ...
/*************************************************************
/*  SUBROUTINE 'SUBROUT1'
DEFINE SUBROUTINE SUBROUT1
/* ...
WRITE 'IN SUBROUTINE:' FIELD
/* ...
END-SUBROUTINE
/* *************************************************************
END
```